Appl. No. 10/804,647
Reply to Non-Final Office Action of September 15, 2006

Amendments to the Claims:

This listing and version of the claims replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Original) A method for estimating a remaining lifetime of a part in a piece of semiconductor fabrication equipment, comprising the steps of:

selecting a plurality of factors relevant to the remaining lifetime of the part, the plurality of factors including a number of semiconductor wafers that have been processed by the piece of semiconductor fabrication equipment since the part was installed in the piece of equipment; and

estimating the remaining lifetime of the part by a fuzzy inference.

2. (Original) The method of claim 1, wherein the plurality of factors include a length of time that the part has been used.

3. (Original) The method of claim 2, further comprising replacing the part when the estimated remaining lifetime falls below a threshold value.

4. (Original) The method of claim 2, wherein the fuzzy inference is based on the following fuzzy rule set, in which P is the number of semiconductor wafers that have been processed by the piece of semiconductor fabrication equipment since the part was installed in the piece of equipment, T is the length of time that the part has been used, and L is the remaining lifetime of the part:

if P is small, and T is small, then L is large;
if P is medium, and T is small, then L is medium;
if P is large, and T is small, then L is small;
if P is small, and T is medium, then L is large;
if P is medium, and T is medium, then L is medium;
if P is large, and T is medium, then L is small;
if P is small, and T is large, then L is medium;

DM2\887684.1

Appl. No. 10/804,647
Reply to Non-Final Office Action of September 15, 2006

       if P is medium, and T is large, then L is medium; and

       if P is large, and T is large, then L is small.

5.   (Original) The method of claim 2, wherein the fuzzy inference is based on a fuzzy rule set determined using empirical experience.

6.   (Original) The method of claim 2, further comprising the step of automatically collecting the following data for the part: the number of semiconductor wafers that have been processed by the piece of semiconductor fabrication equipment since the part was installed in the piece of equipment, and the length of time that the part has been used.

7.   (Original) The method of claim 1, wherein:

       the plurality of factors include a length of time that the part has been used;

       wherein the fuzzy inference is based on the following fuzzy rule set determined using empirical experience, in which P is the number of semiconductor wafers that have been processed by the piece of semiconductor fabrication equipment since the part was installed in the piece of equipment, T is the length of time that the part has been used, and L is the remaining lifetime of the part:

       if P is small, and T is small, then L is large;

       if P is medium, and T is small, then L is medium;

       if P is large, and T is small, then L is small;

       if P is small, and T is medium, then L is large;

       if P is medium, and T is medium, then L is medium;

       if P is large, and T is medium, then L is small;

       if P is small, and T is large, then L is medium;

       if P is medium, and T is large, then L is medium; and

       if P is large, and T is large, then L is small.

8.   (Currently amended) A system for estimating a remaining lifetime of a part in a piece of semiconductor fabrication equipment, comprising:

Page 3 of 8

DM2\887684.1

PAGE 4/9 * RCVD AT 12/12/2006 6:38:18 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-6/31 * DNIS:2738300 * CSID:6197442201 * DURATION (mm-ss):01-58

Appl. No. 10/804,647
Reply to Non-Final Office Action of September 15, 2006

means for automatically collecting and storing data representing the a number of semiconductor wafers that have been processed by the piece of semiconductor fabrication equipment since the part was installed in the piece of equipment;

fuzzy inference means for determining degrees of fulfillment of a plurality of rules based on a plurality of factors relevant to the remaining lifetime of the part, the plurality of factors including athe number of semiconductor wafers that have been processed by the piece of semiconductor fabrication equipment since the part was installed in the piece of equipment; and

a defuzzifier for estimating the remaining lifetime of the part based on the degrees of fulfillment of the plurality of rules.

9. (Original) The system of claim 8, wherein the plurality of factors include a length of time that the part has been used.

10. (Original) The system of claim 9, wherein the rules include the following fuzzy rule set, in which P is the number of semiconductor wafers that have been processed by the piece of semiconductor fabrication equipment since the part was installed in the piece of equipment, T is the length of time that the part has been used, and L is the remaining lifetime of the part:

if P is small, and T is small, then L is large;
if P is medium, and T is small, then L is medium;
if P is large, and T is small, then L is small;
if P is small, and T is medium, then L is large;
if P is medium, and T is medium, then L is medium;
if P is large, and T is medium, then L is small;
if P is small, and T is large, then L is medium;
if P is medium, and T is large, then L is medium; and
if P is large, and T is large, then L is small.